

District Responses to Written Comments Received Regarding Technical Assessment Document for Further Study Measure 11: Marine Loading Operations

#	By	Comment	District Response	Citation ¹	Status Date
1	Eichleay Engineers & Western States Petroleum Association (WSPA)	The emissions rates used were determined with an incomplete testing protocol that did not verify vessel vapor piping configurations or previous vessel tank emissions. Therefore the correlation of these emissions to the specific products (i.e. high sulfur fuel oil and light cycle oil) is not validated.	The protocol was developed by the workgroup. The staff agrees that multiple factors affect the relative emission factor for a particular cargo. The main point in the study is that emissions do exist above the current regulatory standard when loading materials that are not covered by current District rules. Staff is open to receive additional information.	I.B Findings Bullet 1	1/16/03
2	Eichleay Engineers & WSPA	Suggested wording: Additional testing would be required to define relative emissions factors for each cargo using certified test protocols that correlates emission factors for each product.	The staff is open to receiving additional testing and emission information.	I.B Findings Bullet 4	1/16/03
3	Eichleay Engineers & WSPA	a. See Commentary #1 above. b. Product testing including flash point, loaded temperature, etc. may be a better indicator of cargo classification.	Multiple factors affect the relative emission factor for a particular cargo. The latest version of the TAD does contain flash point and loading temperature if available. The staff is open to receiving additional information.	I.B Findings Bullet 5	1/16/03
4	Eichleay Engineers & WSPA	Proposed paragraph addition: Proposed modification to the current regulations may have a significant impact on the generation of air pollutants including NOx, SOx, CO. In addition there may be a significant increase in the use of natural gas and electricity. Additional study would be required to quantify these resultant pollutants and natural resource depletion.	The staff agrees that emissions from other pollutants and expenditures will likely increase if additional cargos were subject to control. The degree would depend on the control strategy chosen to comply. A more detailed analysis will be undertaken should this study move to rule development. Revised wording under consideration	I.B Findings	1/16/03

¹ Subject to change depending on any further revisions to the Technical Assessment Document.

**District Responses to Written Comments Received Regarding
Technical Assessment Document for Further Study Measure 11:
Marine Loading Operations**

#	By	Comment	District Response	Citation ¹	Status Date
5	Eichleay Engineers & WSPA	<p>a. Provide inventory and calculations used in the emissions inventory. The inventory is based on 1998-2000 data where significant events and economic factors required significantly more marine traffic than historically required.</p> <p>b. Based on recent and forecasted marine loading, non-regulated loadings have been extremely low. During the 2002 ozone season, the non-regulated product loadings have been significantly lower than in recent years.</p>	<p>a. An inventory table was added to the latest version.</p> <p>b. The amount of non-regulated loadings will be a factor in the rule-making phase. Also, the amount of non-regulated loadings during the ozone season could be part of a future regulatory strategy.</p>	I.B.1 inventory	1/16/03
6	Eichleay Engineers & WSPA	<p>a. Validate the Air District's inventory of emissions base on current and long term forecast of marine loading in the San Francisco Bay Area.</p> <p>b. Review the seasonality of marine loading for its contribution to actual ozone generation during the ozone season.</p>	<p>Revised wording is being considered to state that the emissions inventory be changed to better reflect actual emissions. There is no exact emission factor for a particular cargo.</p> <p>Seasonality may be considered should the study move to rule development.</p>	II.A Changes to Emissions Inventory	1/16/03
7	Eichleay Engineers & WSPA	Proposed bullet addition: Modify BAAQMD protocol to include known factors that affect tank vapor emissions including: Quantification of previous tank vapors, verification of tank piping alignments to insure that the proper vapors are being measured, loading conditions of the product stock, depth of tank loaded, product characteristics, etc.	The staff is open to receiving all data that is available and pertinent to the FSM. A lot of this information can be provided by industry.	II.C Areas for Further Study	1/16/03
8	Eichleay Engineers & WSPA	Coordinate with refineries to gather and compile this information to validate certified vapor emissions factors.	Any additional information that industry can provide is welcomed.	II.C Areas for Further Study	1/16/03

**District Responses to Written Comments Received Regarding
Technical Assessment Document for Further Study Measure 11:
Marine Loading Operations**

#	By	Comment	District Response	Citation ¹	Status Date
9	Eichleay Engineers & WSPA	<p>a. Compile information on the generation of additional air pollutants (NO_x, SO_x, CO) that would be caused by modifying the existing regulations.</p> <p>b. Compile information on the increase in the use of natural gas and electricity resources that would be caused by modifying the existing regulations.</p>	Additional data is needed. This will be handled should the study go to rule development.	II.C Areas for Further Study	1/16/03
10	Eichleay Engineers & WSPA	In addition, additional VOC's may be introduced from various sources such as: (1) improper vapor piping configurations when vapor source emissions testing and (2) Vessel Inert Gas Systems (IGS).	The staff agrees that piping and inert blanketing systems may affect the relative emission factor.	III.A Background	1/16/03
11	Eichleay Engineers & WSPA	Paragraph unclear	If a vessel is loading regulated and unregulated cargos, one facility does not disconnect the vapor control system when the unregulated cargo is being loaded. All loads for that vessel are controlled.	IV.A Inventory	1/16/03

**District Responses to Written Comments Received Regarding
Technical Assessment Document for Further Study Measure 11:
Marine Loading Operations**

#	By	Comment	District Response	Citation ¹	Status Date
12	Eichleay Engineers & WSPA	<p>a. The standardized procedure used by the Air District is inadequate since the control and quantification of major items that can affect the resultant vapor tank emissions are classified as optional data gathering (Protocol Section 5.2) and has not been used in correlating the resultant emission factors.</p> <p>b. These additional factors include: Quantification of previous tank vapors, verification of tank piping alignments to insure that the proper vapors are being measured, loading conditions of the product stock, depth of tank loaded, product characteristics, etc.</p> <p>c. These additional factors are significant and require quantification and verification to validate vapor emission factors.</p>	<p>The protocol was developed by the workgroup. The relative emission factor for a particular cargo will vary depending on the vessel, the loading conditions, and outside conditions. Revised wording will be considered. Any additional information that industry can provide is welcomed.</p> <p>There is no exact emission factor for a particular cargo. The intent of the document is to point out that emissions for currently unregulated cargos are above the current standard.</p> <p>The recommendation for the inventory will be to change the emissions inventory to better reflect actual emissions.</p>	IV.B Testing	1/16/03
13	Eichleay Engineers & WSPA	The factors shown do not reflect a qualified correlation of vapor emissions with the product stocks shown. See Commentary 8a and 8b above.	The intent of the table is to illustrate that benzene, toluene, ethyl benzene, p/m xylene, and o-xylene are emitted during marine loading and should be considered.	IV.B Testing BTEX table	1/16/03
14	Eichleay Engineers & WSPA	See Commentary 8b above.	The intent of the document is to point out that emissions for currently unregulated cargos are above the current standard.	V.A Emissions and Emission Reductions	1/16/03

**District Responses to Written Comments Received Regarding
Technical Assessment Document for Further Study Measure 11:
Marine Loading Operations**

#	By	Comment	District Response	Citation ¹	Status Date
15.	Eichleay Engineers & WSPA	Commentary 8a and 8b above.	The intent of table is to illustrate possible emissions using different scenarios.	V.A Emissions and Emission Reductions	1/16/03
16	Eichleay Engineers & WSPA	Proposed paragraph addition: Proposed modification to the current regulations may have a significant impact on the generation of air pollutants including NOx, SOx, CO. In addition there maybe a significant increase in the use of natural gas and electricity. Additional study would be required to quantify these resultant pollutants and natural resource depletion.	Revised wording will be considered. These statements are true depending on the type of control technology used.	V.A Emissions and Emission Reductions	1/16/03
17	Valero Refinery	Valero agrees with concerns expressed by Eichleay regarding use of carbon adsorption systems to abate hydrocarbon emissions from marine loading of heavy liquids, especially concerns about deposition of sulfur and entrained residues on the carbon beds. Furthermore, Valero has concerns about the ability of its carbon regeneration system to remove sulfur and residues by vacuum. If permanent deposition of these contaminants occurs, the regenerable carbon system essentially becomes a non-regenerable carbon system, and therefore uneconomic to operate, especially for gasoline loading.	A more detailed analysis of control systems will be undertaken should this study move to rule development.	V.B Economic Impacts	1/16/03

**District Responses to Written Comments Received Regarding
Technical Assessment Document for Further Study Measure 11:
Marine Loading Operations**

#	By	Comment	District Response	Citation ¹	Status Date
18	Valero Refinery	Since Valero's marine loading dock is located about two miles from the refinery, the carbon adsorption unit must necessarily operate independently from the rest of the refinery. Plot space is limited at the dock and adjacent on-shore area for installation of potential new facilities or modifications to the existing system.	A more detailed cost analysis will be undertaken should this study move to rule development.	V.B Economic Impacts	1/16/03
19	Valero Refinery	<p>An important part of Valero's carbon adsorption operation is an absorber tower filled with packing material which is used to absorb vapors removed from the off-line carbon beds during the vacuum regeneration cycle. The scrubbed vapors from the tower are then routed to the on-line carbon beds for additional hydrocarbon removal prior to venting the stream to atmosphere. The absorber tower is designed to circulate a light liquid such as gasoline as the absorbent material. Since the dock is isolated from the refinery, the absorber tower currently uses a slipstream of material being loaded into the vessel as absorbent material. Then the enriched absorbent material is also loaded into the vessel along with the rest of the cargo.</p> <p>The carbon adsorption system was designed for loading finished gasoline and gasoline components (light liquids), including operation of the absorber tower. If Valero loads heavy liquids with the current system,</p>	A more detailed analysis of control systems, including activated carbon, incineration, and other systems, will be undertaken should this study move to rule development.	V.B Economic Impacts	1/16/03

**District Responses to Written Comments Received Regarding
Technical Assessment Document for Further Study Measure 11:
Marine Loading Operations**

#	By	Comment	District Response	Citation ¹	Status Date
		<p>a slipstream of heavy liquid must be used as absorbent material in the tower. This could potentially foul and/or plug the packed bed absorber tower. In addition, residual heavy liquid in the tower from a prior loading event could potentially contaminate the current cargo being loaded, especially if finished gasoline were being loaded.</p> <p>John Zink, the supplier of Valero's carbon adsorption system, has indicated that it needs to perform a comprehensive study to determine the feasibility of the existing system for abating emissions from loading heavy liquids, with the added complication that two docks (Valero dock and the old Huntway dock) need to be abated. Until these unique technical issues for Valero's regenerable carbon system are resolved, Valero must conservatively assume that a new thermal oxidizer is required to abate emissions from all types of loaded materials at both docks.</p>			
20	Eichleay Engineers & WSPA	<p>SEE NON-REGULATED PRODCUTS MATRIX</p> <p>"Eichleay080802.pdf"</p>	<p>The table assumes all refinery terminals will need to install additional control equipment and their choice of control device would be a thermal oxidizer.</p> <p>A more detailed cost analysis will be undertaken should this study move to rule development.</p>	V.B Economic Impacts	1/16/03

**District Responses to Written Comments Received Regarding
Technical Assessment Document for Further Study Measure 11:
Marine Loading Operations**

#	By	Comment	District Response	Citation ¹	Status Date
21	Chevron	<p>Potential Control Strategies</p> <p>Non-combustion control strategies have technical and economic limitations that will impact their applications for medium and heavy hydrocarbon products. Specific observations are:</p> <p>Vapor balancing</p> <ul style="list-style-type: none"> • It is not feasible for products loaded out of floating roof tanks. • The value of recovered hydrocarbons would not justify the cost of installing vapor piping networks at refineries and terminals. • If a vessel's compartment previously contained a product that differed from the material being loaded, the introduction of these vapors into the onshore tank could raise safety or product quality concerns. • While vapor balancing is conceptually straightforward with ship-to-ship transfers, the lightering vessel will face the previous three issues when it returns to shore for refilling. <p>Refrigeration</p> <ul style="list-style-type: none"> • These systems typically operate in the range of -150° F for this type of application. The 	<p>A more detailed analysis of control systems, including activated carbon, incineration, and other systems, will be undertaken should this study move to rule development. District rules normally do not dictate technology, but provide the standard.</p>	<p>Potential Control Strategies Page 2 & 6</p>	3/10/03

**District Responses to Written Comments Received Regarding
Technical Assessment Document for Further Study Measure 11:
Marine Loading Operations**

#	By	Comment	District Response	Citation ¹	Status Date
		<p>equipment needed to achieve these temperatures has high capital, energy and maintenance costs. The rate of hydrocarbon recovery will not justify the expense.</p> <ul style="list-style-type: none"> • The composition of recovered hydrocarbons will vary. Any recovered liquids must be re-refined before use. <p>Carbon adsorption</p> <ul style="list-style-type: none"> • Carbon in C6+ service can only be regenerated with hot air and loses capacity with each regeneration. The contaminated regeneration air would require subsequent treatment in a combustion device before discharge. At least one vendor reports that beds are typically sent out for reactivation after 10 cycles in this type of service. Reactivation involves heating the carbon to 1600-1800° F until hydrocarbons are driven off. This operation incurs transportation costs and generates emissions at the reactivation facility. • The manufacture and reactivation of carbon have both economic and environmental impacts. Lifecycle costs of activated 			

**District Responses to Written Comments Received Regarding
Technical Assessment Document for Further Study Measure 11:
Marine Loading Operations**

#	By	Comment	District Response	Citation ¹	Status Date
		carbon should be factored into any impact analysis. If emission control is required, combustion devices will certainly be part of almost all strategies.			
22	Chevron	Other Test Results Chevron also lighters fuel oil and black oil onto ships in the Bay Area.	The District will request information from Chevron to better characterize the lightering activity of currently non-regulated cargos.	Page 11	3/10/03
23	Chevron	The Chevron wharf can accommodate up to six vessels and it is not uncommon for multiple vessels to be loading at the same time. Only two of the berths can handle large and medium sized ships. One of these berths is not equipped for vapor recovery. Chevron needs two berths to manage its traffic in medium and large tankers. Scheduling all vessels to one berth is not possible. Chevron would incur significant capital expense to retrofit at least one berth with vapor recovery equipment and upgrade its vapor recovery system.	A more detailed analysis of control systems, including activated carbon, incineration, and other systems, will be undertaken should this study move to rule development.	Economic Impacts: Page 14	3/10/03

**District Responses to Written Comments Received Regarding
Technical Assessment Document for Further Study Measure 11:
Marine Loading Operations**

#	By	Comment	District Response	Citation¹	Status Date
24	Chevron	An additional impact is related to the inspection and maintenance of vapor recovery equipment. Currently, emission controls are required for approximately 25% of the cargoes charted on Fig. 1. Routine inspection and maintenance can be easily scheduled. If the regulations are amended to include all cargoes, the three-fold increase in operating time along with the inherent uncertainties in ship schedules will make this difficult if not impossible. Expanded regulation may require the installation of redundant systems to cope with scheduled and unscheduled downtime.	A more detailed cost analysis will be undertaken should this study move to rule development.	Economic Impacts	3/10/03